

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
15 January 2004 (15.01.2004)

PCT

(10) International Publication Number
WO 2004/006519 A1

(51) International Patent Classification⁷: **H04L 12/58**

(21) International Application Number:
PCT/EP2002/007540

(22) International Filing Date: 4 July 2002 (04.07.2002)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant (for all designated States except US): TELEFONAKTIEBOLAGET L M ERICSSON (publ)
[SE/SE]; S-126 25 Stockholm (SE).

(72) Inventor; and

(75) Inventor/Applicant (for US only): NICODEM, Eelco
[NL/NL]; Sonate 33, NL-3335 BK Zwijndrecht (NL).

(74) Agents: VAN KAN, J., J., H. et al.; Algemeen Octrooibureau, World Trade Center, Pastoor Petersstraat 160, NL-5612 LV Eindhoven (NL).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

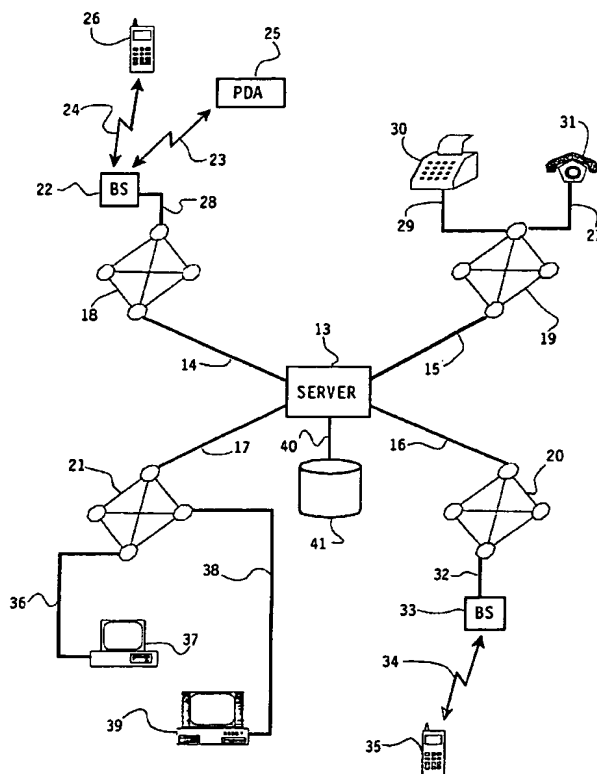
(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

[Continued on next page]

(54) Title: METHOD AND ARRANGEMENT FOR PROVIDING A MESSAGING SERVICE



(57) Abstract: Method for providing a messaging service, wherein a user is subscribed to a plurality of telecommunications services, which services are accessed by the user using one or more access devices (25, 26, 30, 31, 35, 37, 39). These services may comprise IP-based services and the access devices may comprise a UMTS (26) or a TV set-top box (39). Operation of the services is enabled by triggered service-related events, and a trigger of one of the service-related events is received by a server (13). The server (13) sends a message to at least one of the access devices (25, 26, 30, 31, 35, 37, 39) of the user upon receiving of the trigger. The method comprises a step of detecting which of the access devices (25, 26, 30, 31, 35, 37, 39) is used regularly by the user in dependence of an operational mode and operational capabilities of each of the access devices (25, 26, 30, 31, 35, 37, 39) and in dependence of preferences of the user.



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Title

Method and arrangement for providing a messaging service

5

Field of the Invention

The present invention relates to a method of delivering telecommunications services, wherein a user has access to a plurality of services, such as digital cable television services, telematic services, Plain Old Telephone Services (POTS) or Internet-Protocol-based (IP) services, which services are provided to the user via at least one network and are accessed by the user using one or more access devices, such as a UMTS phone or a TV set-top box, characterized in that any of the plurality of services is delivered to the user based on result of performing use-analysis of any of the services and the access devices.

15

The present invention further relates to an arrangement for delivering telecommunications services, comprising means for providing access to a plurality of services via at least one network and via one or more access devices, characterized in that the arrangement further comprises means for performing use-analysis of any of the services and the access devices, and means for delivering any of the plurality of services to the user based on result of the performed use-analysis of any of the services and the access devices.

20

25

Background of the Invention

30

In modern telecommunications most users are subscribed to a number of different telecommunication services, enabling these users to use modern communication techniques wherever they are and whenever they desire.

A user may have plain old telephone services (POTS) and/or

a TV set-top box at home, a mobile telephone such as universal mobile telecommunication system (UMTS) or global system for mobile communications (GSM) and a personal computer (PC) connected to the internet. More sophisticated users additionally have fax machines, 5 pagers, personal digital assistants (PDA, or handheld), (telematics) alarm systems or laptops.

The above-mentioned access devices, which are just a few out of a long list of other possible access devices, can be used to access an even longer list of different services, such as internet access 10 (web surfing, internet TV), electronic mail (e-mail), fax services, voice services, voice mail services (VMS), short message service (SMS), data services, telematics services and many more.

The abovementioned services may all be actively used by the user. In an even broader view, an enormous source of telecommunications services and services that make use of telecommunications services are 15 used on a day-to-day basis without the user being aware of it, even unintentional. A user may withdraw money via an automatic teller machine (ATM), or pay his/her groceries with a credit card or bank card. By performing the transaction, use is made of telecommunications services. A 20 user may also use an identification card to access an office building, upon which the security system records his presence in the building. These security systems may be connected to a security network, using telecommunications services.

To offer all these services, telecommunications operators 25 separate their networks into logical networks that may use the same physical connections, but are transparent to each other. Examples are voice, data and IP-based platforms. Each service uses its own protocol, which can be understood and translated into commands by access devices through which the service can be accessed.

30 Originally, telecommunications services were provided via networks that were specifically designed for these services. The first

voice services were provided to the user via physical land lines. Growing demand for telecommunications services lead to the development of all kinds of multiplexing techniques, the introduction of fibre optics and the use of personal wireless communications. Also other type of networks have been used, like power networks and cable television networks, because of their long history of use and thus the fact that these networks have been fully integrated in society. As a result of all these developments most members of society make constant use of services that are or may be provided via networks, e.g. using power, watching cable or internet TV, making phone calls, withdrawing money from a bank account via an ATM, using a bank card or a credit card in a shop, internet access, using access cards to access buildings, the use of security networks, the use of chips and/or transmitter means in cars for security and registration purposes, the use of identification in public transportation, etc.

Modern telecommunications services have made many things a lot easier and have boosted the economy in the past decennia, but they have also introduced new problems. Most of the telecommunications services are for instance bound to certain hardware. As an example, historically voice services were bound to landline phones and after the introduction of personal wireless communications these services were bound to both landline phones and mobile phones. The integration of services and hardware is an ongoing long-term development.

Reachability of users forms another new problem of modern communications. The many services used by a user make him/her difficult to reach, as he/she needs many access devices to check regularly.

The above drawbacks are illustrated below by looking closer at messaging services in particular. Messaging services, such as e-mail or SMS, are a very popular means of communication. In most cases, however, these are stand-alone services, meaning that messages sent in one protocol or service can not be received in another protocol or

service. Various systems have become available that overcome this drawback, providing a means to trigger a message in one service by sending a message in another service. For instance, some operators use voice mail systems that, upon receiving of a voice mail, send an SMS to a user's mobile phone, so that the user is notified. However, notifications as such do not provide the content of the original message such that, after receipt of a notification, a user has to initiate further action to become aware of the content of the original message.

Another drawback follows directly from the reachability of the telecommunications user. As the user has many access devices to control, he/she has to check every access device regularly to see whether he has new messages. The major benefit mentioned above, the fact that users can communicate wherever they are and whenever they desire, introduces the problem that the better reachable the user is, the less likely it is that a message sent to this user is read instantaneously by this user.

Existing messaging services, and systems, do not provide means to overcome this problem. Arrangements like the voice mail system sending SMS messages, as mentioned in the example above, partly overcome this problem, but on the other hand are limited to a single access device upon which this SMS message is received.

More sophisticated systems might collect messages and triggers sent to other access devices, and notify a user on a single access device. For instance, taking again the example of voice mail, a system might collect all voice mails sent to all access devices of a user, and make these voice mails available on a voice mail system connected to the user's mobile phone. Any combination of the solutions presented above is of course also possible. However, the limitation to a single access device is an issue that still remains. A user of the above system, might not receive any messages in case the battery of this single access device is empty.

Summary of the Invention

It is an object of the present invention to provide a method of and an arrangement for providing telecommunications services, offering extended reachability to the users of these services.

It is an additional object of the present invention to provide a method and an arrangement that is simple and easy to implement, thus reducing cost of production and providing extended compatibility.

These and other objects and advantages of the present invention are provided by a method of delivering telecommunications services, wherein a user has access to a plurality of services, such as digital cable television services, telematic services, Plain Old Telephone Services (POTS) or Internet-Protocol-based (IP) services, which services are provided to the user via at least one network and are accessed by the user using one or more access devices, such as a UMTS phone or a TV set-top box, characterized in that any of the plurality of services is delivered to the user based on result of performing use-analysis of any of the services and the access devices.

With the convergence of networks, the opportunity exists to deploy telecommunications services independent of the subscriber's access device and independent of the originating- and destination network the device is connected to. Such functionality can be enabled by a method for providing telecommunications services which is deployed in between telecom's networks, and which is flexible enough to handle all sorts of incoming events and re-trigger them on any device the subscriber uses frequently and is switched on. Examples of such events can be voice or data calls, message-related signalling events, the receiving of e-mail, etcetera.

In an embodiment of the present invention, the handling and re-triggering is done based on result of performing use-analysis of any of the services and the access devices. This use analysis may, for

example, provide an indication of a user's whereabouts. This indication may be made available by performing an analysis of use of any one or more access device a user may have, which access device is connected to any type of telecommunications network. One could think of cable TV networks, security networks, networks used for financial services, power networks, voice networks, data networks, internet, wireless networks, etcetera.

In a preferred embodiment of the present invention operation of a service invokes at least one service-related event, as mentioned above, and the at least one service-related event is used as an input to the use-analysis of any of services and access devices available to a user.

Events as indicated above may comprise information regarding a user's whereabouts, actions, habits, and other information that may be valuable in a use-analysis of services and access devices that are available to a user.

A method corresponding to the present invention bridges between different originating service types and destination service types, effectively enabling triggering and conversion of messaging services specific to one service type based on incoming events that occurred in another service type after results of a performed use-analysis of any of the services and the access devices, such as the indication of a user's whereabouts, have become available.

A preferred embodiment of the present invention a step of detecting which of the access devices is used regularly comprises detecting an operational mode of each access device, such as whether the access device is switched on or maybe an access device is blocked for receiving messages of a certain type. The operational capabilities of an access device, providing information about which type of service an access device can receive, or the preferences of the user can also be taken into account. A user might for instance prefer to receive messages only on a certain access device at certain times of the day, for example

his mobile phone between 8.00 and 8.30 a.m. when he/she is on the road. A message will then be sent to the selected access device.

According to the invention, a message is composed by a server in a format which is dependent on the type of access device to which the message will be sent. In a certain embodiment this format can be decided upon by the server in case an access device is capable of handling messages in more than one format, for instance a PDA or UMTS phone.

The message composed in the above embodiment may comprise a part of the data which was stored in an event received by the server. This data might be converted before it is included in the message.

The above-mentioned and other features and advantages of the invention are illustrated in the following description of the preferred embodiment of the present invention, with reference to the enclosed drawings. The present invention described hereinafter, will be likewise applicable to any telecommunications system comprising means for providing a plurality of messaging services. Systems arranged for deploying above-mentioned method are regarded as an embodiment of the present invention.

20

Brief Description of the Drawings

Figure 1 shows in a very schematic form a modern telecommunications environment.

Figure 2 schematically shows an embodiment of the present invention.

Figure 3 shows a process flow diagram of an embodiment of the method according to the present invention.

Figure 4 shows another embodiment of the present invention.

30

Detailed Description of the Embodiment

In figure 1 a user 1 is offered a plurality of telecommunication services 2, 3, 4, 5 and 60. The user 1 can access these services using a plurality of access devices 7, 8, 9, 10, 11, 12 and 59.

The user 1 has the choice of subscribing to services like e-mail 2, short messaging service (SMS) 3, voice services 4, multimedia messaging system (MMS) services 5 and fax services 60. E-mail services 2 can be accessed by the user 1 via a television (TV) set-top box 7, a personal computer (PC) 8, a universal mobile telecommunication system (UMTS) personal digital assistant (PDA, or so-called handheld) 9, or a UMTS phone 10. SMS can be accessed by the user 1 using his global system for mobile telecommunications (GSM) mobile phone 11. Voice services 4 can be accessed by user 1 using a UMTS phone 10, a GSM mobile phone 11, or a plain old telephone services (POTS) regular landline phone 12. MMS services 5 can be accessed by user 1 using a UMTS PDA 9 or UMTS phone 10. Fax services 60 can be accessed by user 1 using a fax machine 59.

Of course other types of messaging services exist, which can be accessed using same or other type of access devices, but are left out of the drawing for clarity reasons. The present invention may relate to any other telecommunications service. The readers attention is particularly drawn to modern IP, voice and data-based services, but it will be appreciated by those skilled in the art that the principle disclosed here applies to any service wherein a indications are received or provided to a user via a network. In addition to the examples described above the present invention may be used in combination with services related to or based on transmitted TV or radio signals, satellite communications, signalling via electricity networks, railways, road and traffic signalling, or similar means of communications. The invention is, of course, not limited to such services.

Figure 1 clearly shows how difficult it can be to reach

user 1 in case of an emergency. The party who wants to get a message across, has the choice out of five different ways of reaching the user via six possible access devices. This might cost the other party quite a lot of time and in the worst case the other party only has part of the numbers and addresses of user 1 required to reach him/her.

Figure 2 shows an embodiment of the present invention, wherein a server 13 is connected to a number of telecommunication's networks 18, 19, 20 and 21, via connections 14, 15, 16 and 17. Telecommunications network 18 is a UMTS-network, for example, to which base stations 22 connect providing wireless links 23, 24 to access devices such as a PDA 25 or a UMTS-phone 26. Network 19 is, for example, a POTS-network, to which landline telephones 31 or fax machines 30 are connected via wireline connections 27 and 29. Telecommunications network 20 is, for example, a GSM network to which base stations 33 connect via links 32, which base stations 33 provide wireless connections 34 to GSM mobile phones 35. Telecommunications network 21 is an IP-based network, like internet, to which a personal computer 37 may be connected via wireline connection 36. A TV set-top box 39 may be connected via connection 38 to the IP-based network 21 as well.

Server 13 is also connected to a repository or database 41 via connection 40. This database comprises information on historic use of access devices, for example 25, 26, 30, 31, 35, 37, 39. Based on actually measured and/or statistical data, this information on historic use may include the frequency of use of access devices within a given time frame, the order of use of access devices, which device is used first, second, etc., the access device that is used last, the operational mode of access devices, for example, is a device switched on or off, or is it in silent mode, the frequency of use of access devices in combination with the nature of received messages, for example, based on historic use it may be evident that a user prefers to receive text messages in SMS format, as opposed to e-mail format, geographical history of a device, where has the

device been in a given time frame. It will be appreciated that within the tracking, recording, storage or use of the information on historic use, this information is not limited by the examples presented above.

Database 41 may further comprise information which is
5 unrelated to the history of use of access devices like, for example, 25,
26, 30, 31, 35, 37, 39. For example, the information that is kept for
history tracking, as described above, may be made available for a present
moment, so non-historic e.g. the current geographical location of a
device, or the current operational mode. Other examples of information
10 which is unrelated to the history of use are user preferences,
operational capabilities, which formats can be handled by a device, like
for example whether it is a multimedia device capable of handling
internet TV or a plain voice based telephone, physical or other
characteristics of the device, like the dimensions of the user interface
15 or the mobility of a device, e.g. size of the screen of a mobile or
whether a device is wireless or not, or similar information that is
unrelated to the history.

The information stored in database 41 as mentioned above
may, in a preferred embodiment, be available in the form of a destination
20 device decision matrix (not shown), that indicates which device should be
selected given absence or presence of certain message content. This
destination device decision matrix may be a table comprising a
presentation of at least part of the abovementioned historic use data and
non-historic data. This data may be presented in a summarized format.

25 In this preferred embodiment, the method according to the
present invention is carried out by server 13. In this embodiment a
method as shown in figure 3 is used. This method will be illustrated by
an example. Suppose a user 1 has left home to go to work, taking his UMTS
mobile phone 26 with him, and someone (not shown) sends user 1 an urgent
30 message containing pictures or a digital movie on his set-top box 39 via
e-mail.

Service-related event 42, related to an incoming e-mail message containing multimedia attachments on TV set-top box 39, is received 43 by server 13. Server 13 processes 44 this event. The processing 44 could comprise functions as event decoding and analysis, event categorisation, event prioritisation, or any other processing function. Server 13 first briefly checks whether the user is subscribed 48 to the messaging service provided by the embodiment of the present invention. In case the user 1 is not subscribed 45, the event is ignored 46 and the process is ended 47, the server 13 waits for a new event (not shown).

In case the user is subscribed 49, server 13 starts a device search 50. During the device search 50, the server 13 looks up information regarding the access devices of the user 1 in a data base 41. This database 41 comprises information regarding the available access devices of the user 1, the operational capabilities of the access devices, subscriber preferences per device, or likewise. In this particular example, server 13 will attempt to identify an access device that is capable of handling e-mail with multimedia attachments. The server 13 may conclude that, besides the set-top box 39, a PC 37, a UMTS phone 26 and a UMTS PDA 25 are available to user 1 and meet the requirements. After this step 50, the server 13 will check 51 from historic use data whether the devices selected in step 50 are used regularly or are currently switched on, for example. The server 13 may conclude that the set-top box has not been used over the past 12 hours, the PDA 25 has been used an hour ago but is currently switched off and the UMTS phone 26 has been used twice in the last 15 minutes and is switched on. The output of this step is a destination device decision matrix, that indicates which device should be selected given absence or presence of certain message content (not shown).

A method of selecting an access device, according to an embodiment of the present invention, may proceed as follows based on a

destination device decision matrix determined as described above. In case a device is not used regularly 52, as for the set-top box 39, for example, server 13 proceeds with step 50. In case a device is regularly used 53, as for the UMTS phone 26, for example, server 13 starts
5 converting 55, if necessary, data from or about the event trigger 42 to an appropriate format that can be used in a message 58 that will be sent to the targeted access device. In the example this access device is UMTS phone 26 and the message format might be multimedia messaging system (MMS) format. After conversion of the data 55, server 13 may compose a
10 message 56 and send 57, 58 the message to the appropriate access device, in this case as mentioned UMTS phone 26.

The user 1 will receive an MMS message on his UMTS phone 26, for instance comprising the contents of the original e-mail message including attachments. The message may further comprise additional
15 information like an indication of the access device that originally received the message.

Instead of selecting and sending a message to an access device of a user based on whether the device is used regularly by the user, other selection criteria such as, but not limited to, an
20 operational mode, operational capabilities of an access device and/or user preferences.

Figure 4 shows another embodiment of the invention. Here, out of a plurality of telecommunications networks, network A 61 and network N 62 are shown, comprising a plurality of service provisioning
25 systems 63, 64, 65, 66, 67 which are connected to routing switches 70 and 71, via connections 82, 83, 84, 85, 86, 87 and 88. A user 77 may be connected to the networks 61 and 62 via access devices 72, 73, 74, 75 and 76, which are connected to routers 70 and 71 via connections 89, 90, 91, 92 and 93. Routers 70 and 71 may be interconnected via a connection 94.
30 As will be appreciated by those skilled in art, routers 70 and 71, as well as the access devices 72-76 and services 63-67) may be connected to

any other routers, services and access devices in networks that are not shown in figure 4, but may have a similar layout.

5 A processing unit 68 is connected to the service provisioning systems 63-67 via connections such as 78, 79 and 80. In the configuration shown in figure 4, these connections carry one-way traffic from the service provisioning systems 63-67 to the processing unit 68. This one-way traffic may be comprised of service related events, generated by the service provisioning systems 63-67. The events may contain information about how the service will be delivered, such as on
10 which access device 72-76. The processing unit 68 may record this information and store same in a database 69, which is connected to the processing unit 68 via connection 95. The processing unit may perform use-analysis of services received and used by user 77 or use-analysis of access devices 72-76. The results of such an analysis may be sent to
15 routing switches 70 and 71 via connection 81, which connects the processing unit 68 to the routing switches 70 and 71. This information may be used to drive the routing switches 70 and 71, such that services are delivered to the user on an access device that is most likely available for use by user 77, for example, his mobile when he/she is on
20 the road or his set-top box when he/she is watching TV.

Another embodiment of the invention, which is not shown in the figures, is the use of virtual entities that 'follow' a user in a telecommunications network. Such virtual entities may record all kinds of information regarding a user's whereabouts, habits, access devices,
25 wishes, limitations, preferences, etc. One can think of entities that are managed by processing units, such as 68 in figure 4 or 13 in figure 2. Such entities can be applied in the management of telecommunications services, for example.

30 It will be appreciated that numerous modifications and variations of the present invention are possible in the light of the above teachings. It is therefore understood that within the scope of the

attached claims, the invention may be practised otherwise than as specifically described herein.

Claims

1. Method of delivering telecommunications services, wherein a user has access to a plurality of services, such as digital cable
5 television services, telematic services, Plain Old Telephone Services (POTS) or Internet-Protocol-based (IP) services, which services are provided to the user via at least one network and are accessed by the user using one or more access devices, such as a UMTS phone or a TV set-top box, characterized in that any of said plurality of services is
10 delivered to said user based on result of performing use-analysis of any of said services and said access devices.
2. Method according to claim 1, wherein operation of a service invokes at least one service-related event, and wherein said at least one service-related event is used as an input to said use-analysis of any of
15 said services and said access devices.
3. Method according to any of the previous claims, wherein said telecommunications services are comprised of messaging services.
4. Method according to any of the previous claims, wherein a personal identification by said user, such as a personal identification
20 for use of banking services or public transportation, is used as an input to said use-analysis of any of said services and said access devices.
5. Method according to any of the previous claims, further comprising a step of keeping a history of results of said use-analysis of any of said services and said access devices, and wherein delivery of
25 said plurality of services is based on said history.
6. Method according to any of the previous claims, comprising a step of selecting an access device of the user for delivering any of said plurality of services, and wherein said selection depends on an operational mode of any of the access devices of the user.
- 30 7. Method according to any of the previous claims, comprising a step of selecting an access device of the user for delivering any of

said plurality of services, and wherein said selection depends on operational capabilities of any of the access devices of the user.

8. Method according to any of the previous claims, wherein delivering any of said plurality of services further depends on preferences of the user for receiving any of said plurality of services.

9. Method according to any of the previous claims, comprising a step of selecting an access device of the user for delivering any of said plurality of services, wherein at least some of said access devices are of a different type, and wherein a format for delivering said services depends on the type of access device for receiving said services.

10. Method according to any of the previous claims, wherein delivering any of said plurality of services comprises a step of triggering off a message to at least one of said access devices of said user.

11. Method according to any of the previous claims, wherein delivering any of said plurality of services comprises a step of conversion of data into a format selected for delivering said services.

12. Method according to any of the previous claims 2-11, wherein said service-related event comprises service-related content, wherein any of said plurality of services delivered comprises delivering a notification message to said user based on result of performing use-analysis of any of said services and said access devices, said notification message comprising at least part of said content.

13. Arrangement for delivering telecommunications services, comprising means for providing access to a plurality of services via at least one network and via one or more access devices, characterized in that said arrangement further comprises means for performing use-analysis of any of said services and said access devices, and means for delivering any of said plurality of services to said user based on result of said performed use-analysis of any of said services and said access devices.

14. Arrangement according to claim 13, further comprising means for receiving service related events, means for interpreting these service related events, and means for using said events as an input to said use-analysis of any of said services and said access devices.

5 15. Arrangement according to any of the claims 13 and 14, further comprising a database of historic data regarding results of said use-analysis of any of said services and said access devices, and means for storing information regarding said results in said database.

10 16. Arrangement according to any of the claims 13-15, further comprising means for selecting an access device for delivering a service based on result of said performed use-analysis of any of said services and said access devices and at least one of a group comprising an operational mode of any of the access devices, operational capabilities of any of the access devices, and user preferences.

15 17. Arrangement according to any of the claims 13-16, comprising means for converting data into a format that corresponds to any of a service to be delivered to the user and a specific access device.

20 18. Arrangement according to any of the claims 13-17, wherein said means for delivering any of said plurality of services comprises means for triggering off a message to at least one of said access devices of said user.

25 19. Arrangement according to any of the claims 13-18, further comprising means for providing an indication of a user's whereabouts based on result of said use-analysis of any of said services and said access devices.

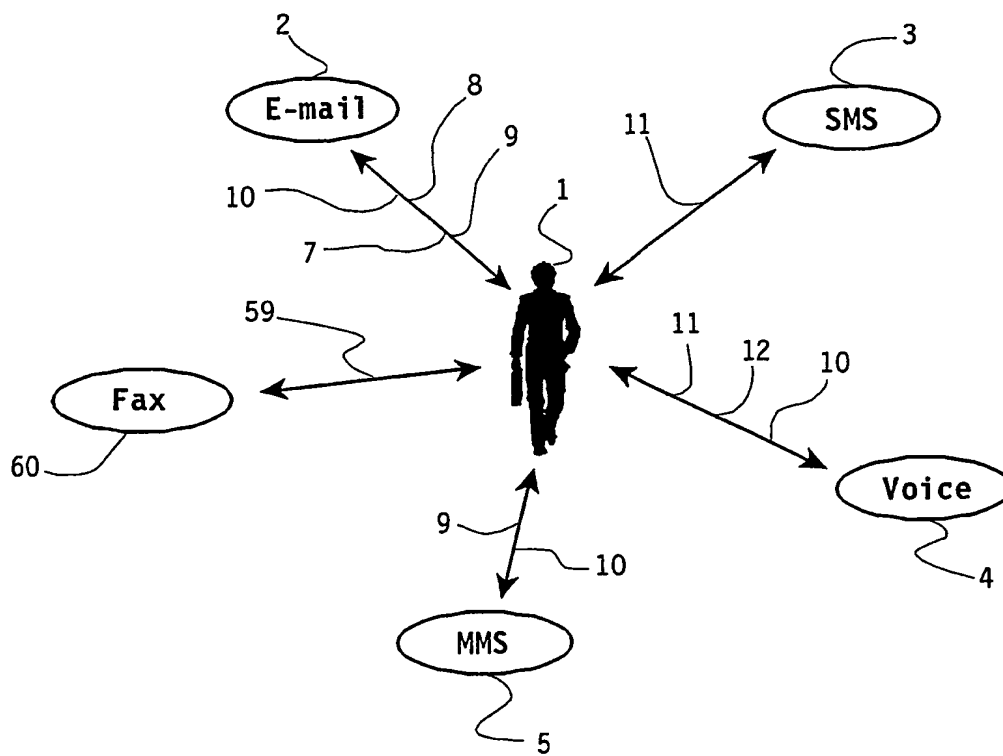


Fig. 1

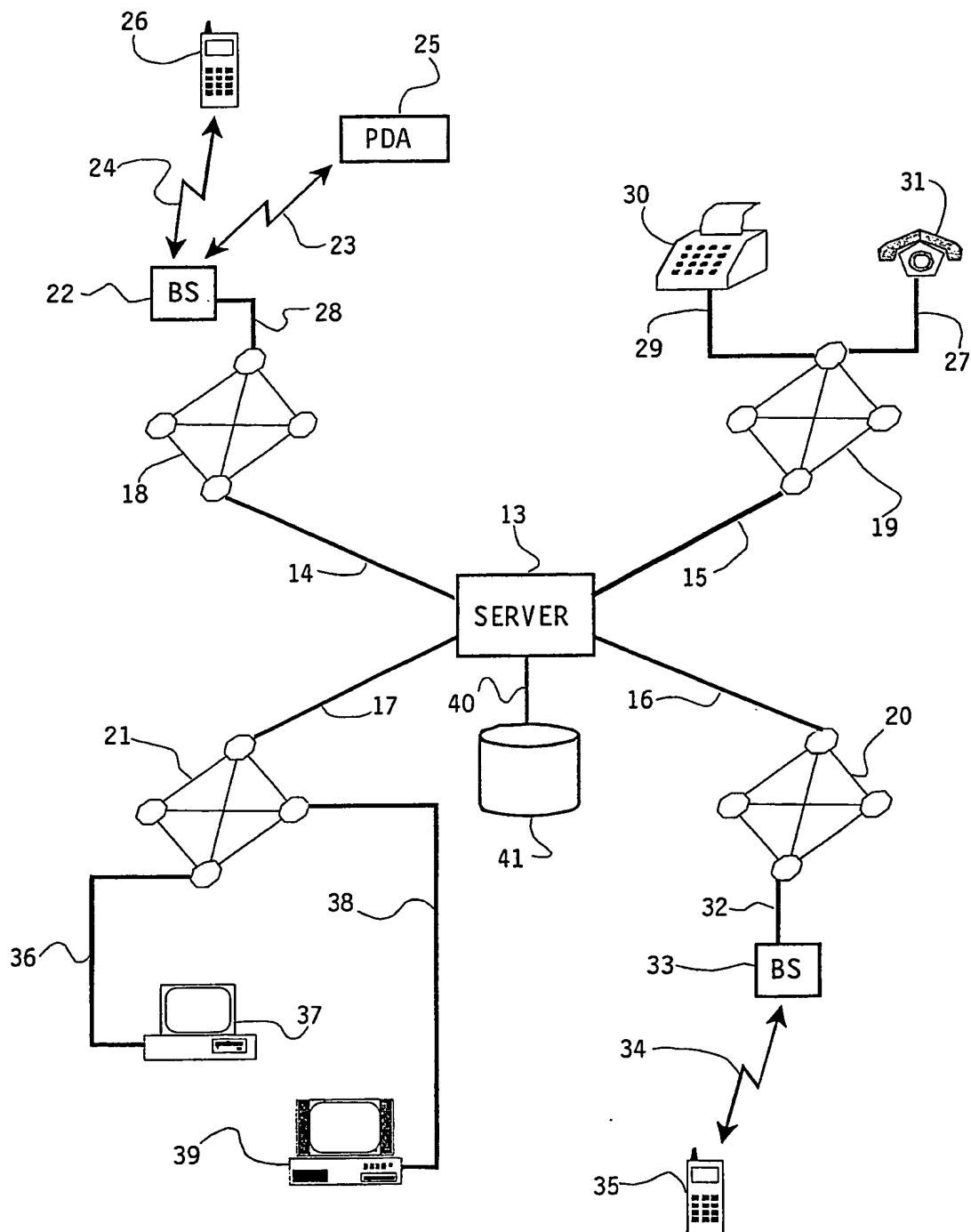


Fig. 2

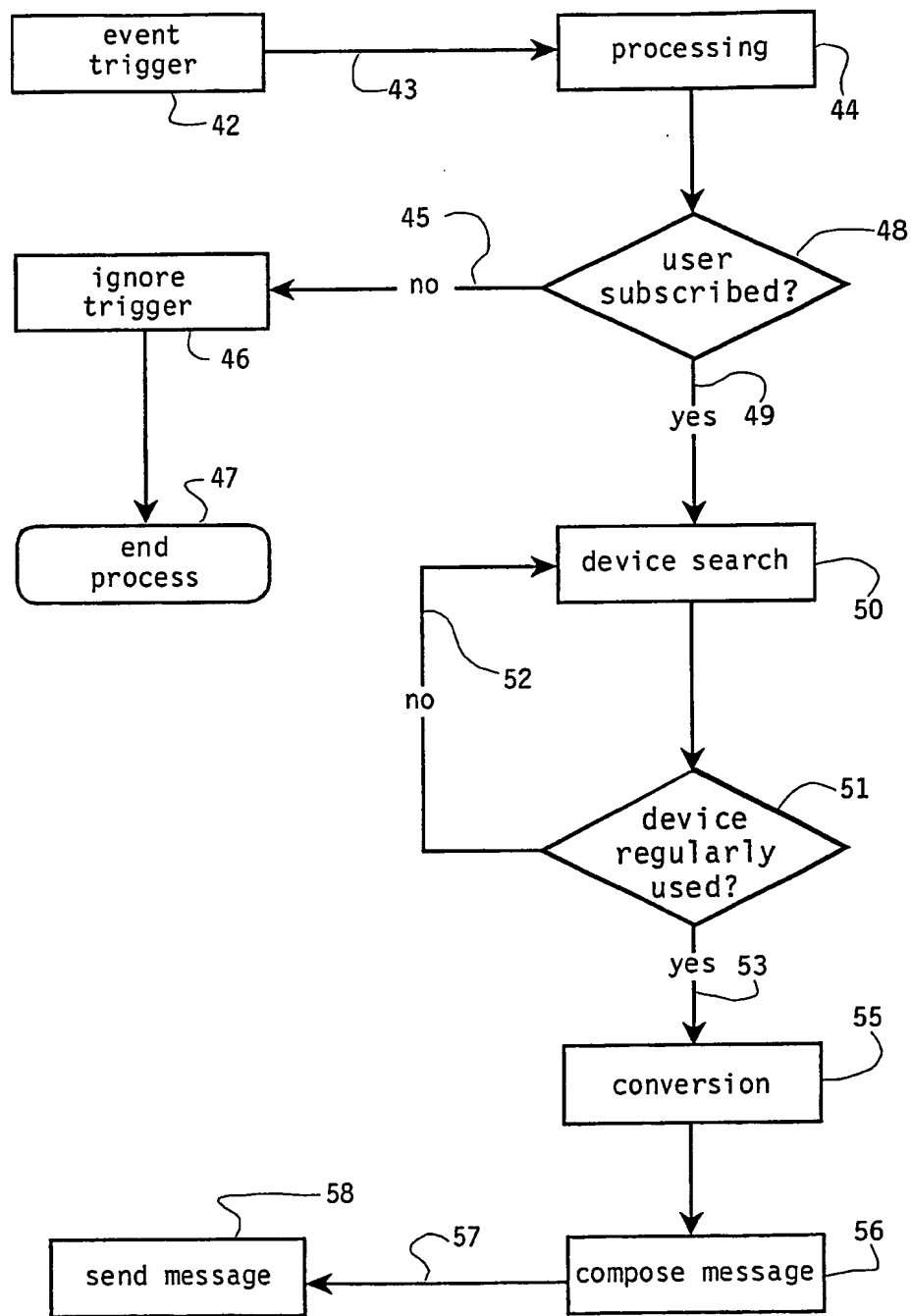


Fig. 3

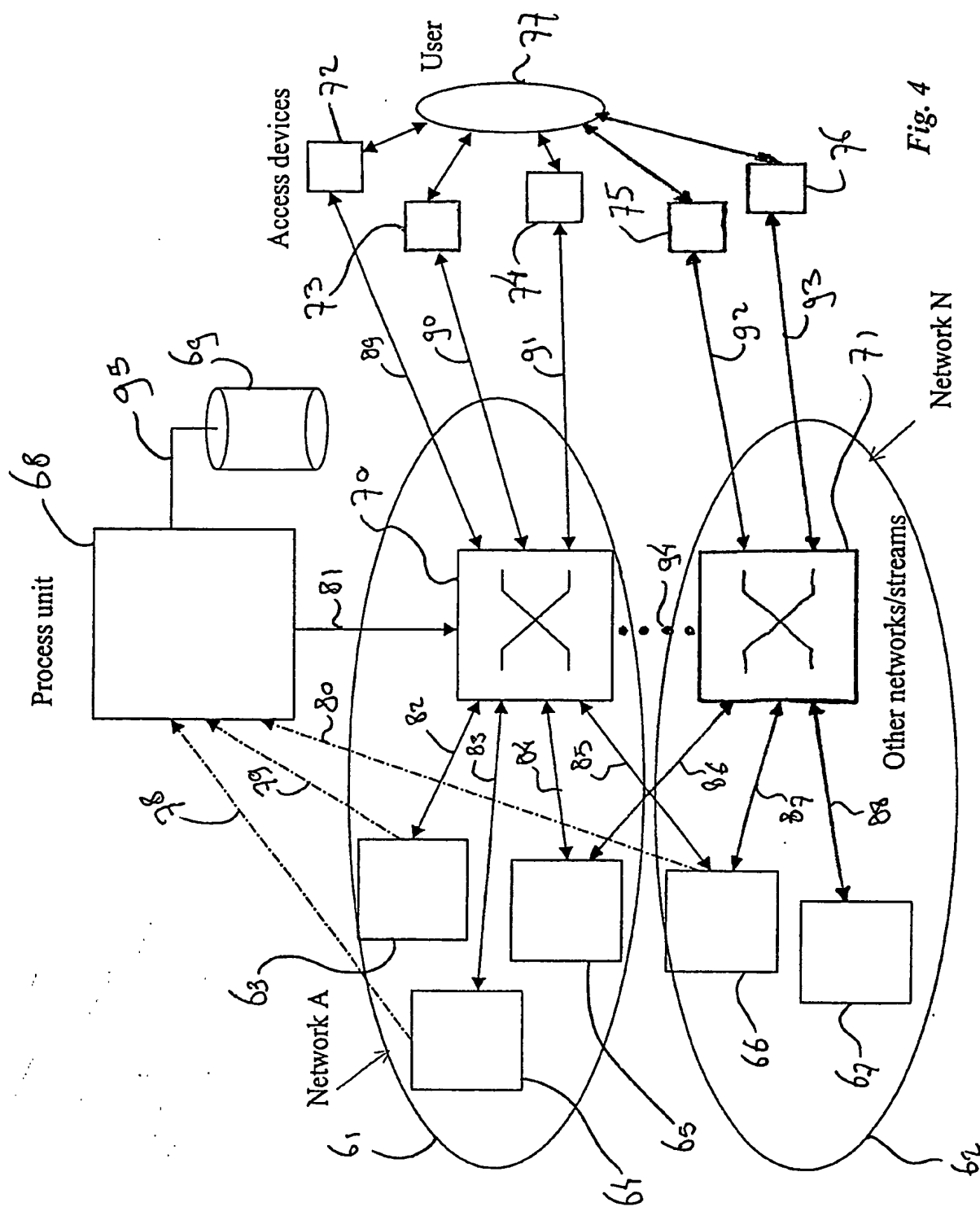


Fig. 4

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 02/07540

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04L12/58

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, IBM-TDB, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01 69387 A (HOVEL DAVID O ;HORVITZ ERIC J (US); JACOBS ANDREW W (US); KADIE CA) 20 September 2001 (2001-09-20) abstract figures 5,6,9,8,11 page 1, line 34 -page 4, line 9 page 7, line 11-29 page 9, line 7-13 page 10, line 16-24 page 11, line 4-7 page 14, line 6-9 page 14, line 31 -page 15, line 18 page 18, line 3-7 page 19, line 24-27 page 36, line 11-19 --- -/--	1-3,5-19

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

26 March 2003

Date of mailing of the international search report

03/04/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Cichra, M

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 02/07540

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 5 493 692 A (GOLDSTEIN RICHARD J ET AL) 20 February 1996 (1996-02-20) abstract claims 1,6,7 column 7, line 1-20 column 8, line 12-26 column 15, line 48-54 column 17, line 5-12 column 19, line 14-23 column 21, line 1-27 column 22, line 60 -column 23, line 17 column 25, line 27-45 column 26, line 1-23 -----	1,4,6,13 2,3,5, 7-12, 14-19
X A	US 5 812 865 A (GOLDSTEIN RICHARD J ET AL) 22 September 1998 (1998-09-22) abstract claims 1,4 column 4, line 27-51 column 7, line 10-31 column 8, line 21-48 column 9, line 16-34 column 23, line 8-37 column 25, line 33-55 -----	1,4,6,13 2,3,5, 7-12, 14-19

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 02/07540

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0169387	A	20-09-2001	US 6513026 B1	28-01-2003
			AU 4755501 A	24-09-2001
			AU 4926101 A	24-09-2001
			EP 1287444 A2	05-03-2003
			EP 1264238 A2	11-12-2002
			WO 0169432 A2	20-09-2001
			WO 0169387 A2	20-09-2001
			US 2002087649 A1	04-07-2002
			US 2002054117 A1	09-05-2002
<hr/>				
US 5493692	A	20-02-1996	NONE	
<hr/>				
US 5812865	A	22-09-1998	NONE	
<hr/>				